

NaViSet™ Administrator

Introduction

Now more than ever IT departments are under increased pressure to maximize the use of hardware resources and reduce support costs. IT personnel must learn how to configure and support a multitude of hardware devices and software packages throughout the product lifecycle. Keeping track of these resources over the product lifetime also plays a vital role in being able to maximize their use and minimize their support costs.

Asset tracking has long been a vital part of this process. In recent years, this tracking has become more sophisticated and has gone beyond attaching a physical asset tag to each hardware device and then keeping a log of when and where each device was in service.

Today it is possible to keep track of hardware and software assets electronically via remote asset management systems that operate over a network. For example, PCs can be tracked and software can be installed, configured and licensing managed – all by remote from a centralized server.

As one of the most expensive and sophisticated PC peripherals, display monitors form a significant portion of the Total Cost of Ownership (TCO) of a modern computer installation. However, the ability to accurately track this asset has been a significant problem due to the lack of effective asset management and monitoring tools. This has resulted in display monitors typically having to be tracked manually throughout the product lifecycle, increasing support costs and TCO.

Additionally, the configuration necessary to ensure that each display monitor is being utilized to its maximum potential has been a burden on IT personnel. This is in part due to the wide variety of controls, the varied control naming and the multitude of user interfaces available on each device across different brands and models. As display monitors have become more sophisticated, in most cases their configuration has also become more complex and time consuming. Incorrect configuration of a display monitor can mean that the asset is underutilized in terms of its capabilities. Incorrect configuration can even cause problems such as eye fatigue and headaches for the user.

NEC's asset management solution

As a worldwide leader in display monitors, NEC has understood these issues and has developed a set of software tools aimed at

bringing the display monitor peripheral into the process of asset management. Better asset management will help reduce TCO by maximizing the use of the display throughout its lifecycle and by minimizing the associated support costs.

The aim of these tools is to make it easier to manage each stage of the product lifecycle - from initial product acquisition through installation and configuration, minimization of power consumption, problem resolution, asset tracking and, finally, the eventual decision for end-of-life disposal.

These tools were developed knowing that many customers have existing asset management tools and procedures in place, and that a proprietary solution is not in the best interests of NEC or the customer. Any solution offered must be flexible enough to complement any existing management tools, and be powerful enough to work on its own in cases where there is no preexisting infrastructure in place. NEC understands that customers may have a variety of different display monitors in use, and that these management tools should not be limited to use with just NEC products, which would effectively limit the tools' overall usefulness.

Finally, these tools should be able to function with a minimum of prerequisite support software requirements, thus keeping costs to a minimum and simplifying usage and support.

It is with these philosophies and goals that NEC developed NaViSet Administrator.

NaViSet Administrator is a Windows-based software tool for remotely managing display monitor assets throughout an enterprise. NaViSet Administrator is based on Windows Management Instrumentation (WMI), which is Microsoft's implementation of the web-based Enterprise Management (WBEM) Standard from the Distributed Management Task Force (DMTF).



NaViSet
Administrator

WMI has been present in some form on all versions of Microsoft Windows since Windows 95. The sophistication and power of WMI has grown with each release of Windows. However, effective management of display monitors has long been severely lacking when using the standard Windows WMI implementation.



NaViSet Administrator operates over the LAN to query remote machines using WMI.

WMI Provider

NaViSet Administrator complements WMI by adding a powerful component known as a WMI Provider, designed specifically to facilitate the tracking and control of display monitor assets and to provide capabilities way beyond those offered by the Windows built-in features. This provider can be installed on each remote machine throughout an installation enterprise.

The WMI Provider is responsible for receiving any queries related to the display monitor, and then in turn enumerating and querying any display monitors attached to the system. The response is then formatted and relayed back. These queries can go beyond simple requests for static metadata about the monitor, such as serial number, model, etc., and extend into sophisticated commands such as configuring the monitor controls, reading diagnostic information or controlling the power state.

In order to perform such commands, a two-way communication link between the host machine and the attached display monitor(s) is necessary. NEC display monitors use a protocol known as Display Data Channel - Command Interface (DDC/CI) which communicates to the display via the existing video cable and video graphics card. This protocol was standardized by VESA and is available on hundreds of different NEC display monitor models.

Large-screen (30" +) NEC displays can also be controlled by using a standard RS-232 interface. On many of these large-screen models, the RS-232 connection can be daisy-chained between multiple monitors, allowing up to 26 monitors to share a single RS-232 COM port on the host machine. Up to 16 COM ports are supported, allowing up to 416 display monitors to be controlled by a single machine, which is ideal for applications such as video walls.

Since the WMI Provider uses standard WMI interfaces and protocols, it can be accessed, with some minimal configuration, by any preexisting asset management tools that are capable of utilizing WMI. This means that the benefits offered in terms of more accurate and sophisticated remote monitoring and control are available without the need to invest in any additional tools, and without the risk of becoming locked into a proprietary solution. Examples of other WMI tools that can be configured to integrate with NaViSet Administrator are MOM, SMS, HP OpenView for Windows (HPOV), CA and Kaseya.

The WMI Provider is also accessible through a variety of different programming APIs in Windows such as: ActiveX script hosting, including Visual Basic Scripting Edition (VBScript); Microsoft Jscript and Perl; as well as Visual Basic Applications; Active Server Pages; C++ and .NET framework applications. The NaViSet Administrator CD-ROM includes some sample VBScripts that demonstrate how to access the monitor metadata and even perform commands.

With the threat of network-based attacks constantly increasing and the ever-present need for data security and integrity, NEC understands that it is essential to minimize all possible vulnerabilities on a computer system. Because the WMI Provider sits under the overall security umbrella of WMI, it does not expose the system to any additional vulnerabilities, such as other solutions that install dedicated server services or open additional IP ports. Access to the WMI Provider is governed by the WMI and user rights controls in Windows, which provides the overall security and authentication for network communications, and user access control.

The WMI Provider operates transparently on each remote machine and the user is unaware of its operation unless an obviously visible adjustment is made to their display monitor by remote. It is only loaded into memory when a relevant request is received by the WMI service, so there is no fixed memory or CPU overhead in installing the WMI provider. Network traffic generated by WMI is an absolute minimum.

Console

The second component of the NaViSet Administrator package is the Console application. This stand-alone tool is typically only used by the system administrator. It connects to remote machines via WMI and queries the NaViSet Administrator WMI Provider and the standard WMI classes and objects to gather detailed information about not only the display monitor, but also the machine as a whole, including the graphics system configuration and machine metadata.

The Console application can be used to not only gather information about the remote machines and the connected display monitors, but it can also actively control and query them in real time. This opens up a whole new world of possibilities for remote

configuration and troubleshooting, thus further decreasing the support costs, time and TCO.

The Console application performs three main types of operations:

1. Connecting one-to-one with a remote machine – In this case, it is possible to remotely query and control a single machine at a time. Controls on the remote display monitors can be adjusted in real time. This is most effective for remote service, support and individual configuration. More than 50 different controls can be read and adjusted remotely, depending on the monitor model.

2. Performing configuration commands on many remote machines – A list of configuration operations to be performed on display monitors connected to multiple remote machines is selected. For example, “adjustment reset” commands could be issued to all the displays on all machines in a classroom. The results of each command, as performed on each remote machine, are logged and can be viewed as an Excel spreadsheet. Commands can be scheduled to be performed at specific times if needed.

3. Querying the configuration and metadata on many remote machines – In this case, a list of remote machines to query is specified as well as a list of which configuration and metadata items are to be retrieved and reported. The results of each query are logged and can be viewed as an Excel spreadsheet. Queries can be scheduled to be performed at specific times if needed. NaViSet Administrator provides a wealth of information about the current state of the display monitors connected to a remote machine, and well as related configuration and metadata information. Examples of this type of information are:

Display monitor related:

- Manufacturer
- Model
- Serial Number
- Date of Manufacture
- Type of display (LCD, CRT, etc.)
- Screen size (horizontal, vertical and diagonal in inches and centimeters)
- Monitor driver version
- Number of hours used (hours “on” and hours with A/C applied)
- Electronic Asset Tag text
- Diagnostic information including internal temperatures
- Current settings of all controls

Graphics system related:

- Graphics card manufacturer, model and driver version.
- Current display resolution setting
- Current color depth setting
- Current video signal frequency
- Supported video signal frequency range

System related:

- Machine manufacturer, model and serial number
- Network name and connected domain name

- Screen saver timeout and password settings

SpectraView_{II}TM related:

- Last calibration date, time and status.
- Monitor usage since last calibration
- Target parameters and calibrated state measurements

Since all of the metadata, query and operation results can be output in standard Excel spreadsheet format, data can easily be further manipulated, compared, graphed, etc., allowing powerful data mining operations to be performed without needing to invest in expensive SQL servers and databases.

The Console will show any diagnostic messages reported by remote displays, such as an internal fan failure or other condition. It can also flag certain inadvisable display configuration settings that may lead to user discomfort or eye fatigue as well as showing the underutilization of the monitor capabilities. For example, it can display a warning message if any of the following conditions are detected:

- An LCD monitor not being driven at its native resolution, which may result in sub-optimal picture quality.
- An LCD monitor being driven with an analog video signal of above 65Hz refresh rate, which may result in sub-optimal picture quality.
- A CRT monitor being driven with an analog video signal of below 70Hz refresh rate, which can lead to eye fatigue and headaches.
- The video graphics adapter color depth setting set to less than 24 bit color, which leads to color posterizing and banding.
- The Windows Screen Saver power setting set to off, which would prevent the display from entering a power saving mode.

NaViSet Administrator also integrates with other NEC technologies such as the SpectraView_{II} Color Calibration System. The current calibration parameters, calibration results and state of remote display monitors can be accessed and tracked remotely. This is particularly useful in applications in which a large number of color-critical displays are deployed and maintained in a color-calibrated state.

NEC display monitors also feature a unique electronic asset tag, which allows a text string to be permanently electronically stored in each display by the administrator. This text can be used for internal tracking purposes, such as assigning a custom asset number or code. This electronic version of a physical asset tag has the advantage in that it can only be erased or altered by an administrator and it can be read remotely.

OSD Lock

In cases where a user has made some unwanted adjustments to a display, the settings can easily be reset remotely to the default conditions. In some applications such as a school or public environment, it may be beneficial to prevent users from being able to adjust the display monitors at all. The front control buttons and

On Screen Display (OSD) can be remotely locked and unlocked using NaViSet Administrator, thus helping to reduce support costs due to unauthorized adjustment.

Power Management

NaViSet Administrator allows power savings to be maximized by supporting power management on several different levels. At the most basic level, the WMI Provider can be instructed to put the display monitors into a power saving mode. This can be done regardless of display model and manufacturer. The Console application can be scheduled to perform this action on a predefined list of remote machines at set times in order to reduce unnecessary power consumption.

Many models of NEC monitors support a Power Off Timer, which can be used to automatically turn the display off after a defined on period. For example, they can be set to turn off after nine hours of usage for a normal working day.

New models of NEC monitors such as the MultiSync 90 Series and several large-screen models feature an internal real-time clock and schedule function. This allows the displays to automatically turn themselves on and off at predefined times and days. Up to seven individual schedules can be programmed on each display monitor. The clock and schedule on each display can be accessed and programmed remotely by the Console application.

NEC display monitors have internal usage clocks that measure both the time that a display has been on and the time that A/C power has been applied. This can give support personnel a better idea of the lifetime and usage characteristics of a display.

Use of the WMI Provider on each remote machine with the NaViSet Administrator Console is optional, but will provide the most benefit in terms of accurate information that can be gathered from a remote machine and the scope of operations that can be performed by remote. On machines that do not have the WMI Provider installed, the Console application will still be able to gather some basic monitor and machine metadata.

Features available remotely using NaViSet Administrator Console

	WMI Provider not installed	WMI Provider with non-NEC display or no DDC/CI support	WMI Provider installed with NEC display and DDC/CI support
Basic monitor information (mfr., model, serial #)	Yes	Yes	Yes
Monitor power control	No	Yes	Yes
Advanced meta-data (power on time, control settings), remote control and adjustment	No	No	Yes

System Requirements

NaViSet Administrator Console has the following system requirements:

- Microsoft Windows 2000 or Windows XP Professional (Windows XP Home Edition is not supported), Windows XP x64, or Windows Server 2003
- TCP/IP based network
- Administrator account access for installing software and connecting to remote machines
- Microsoft Excel for viewing output spreadsheets (optional)

NaViSet Administrator WMI Provider (DDC/CI version) features additionally require:

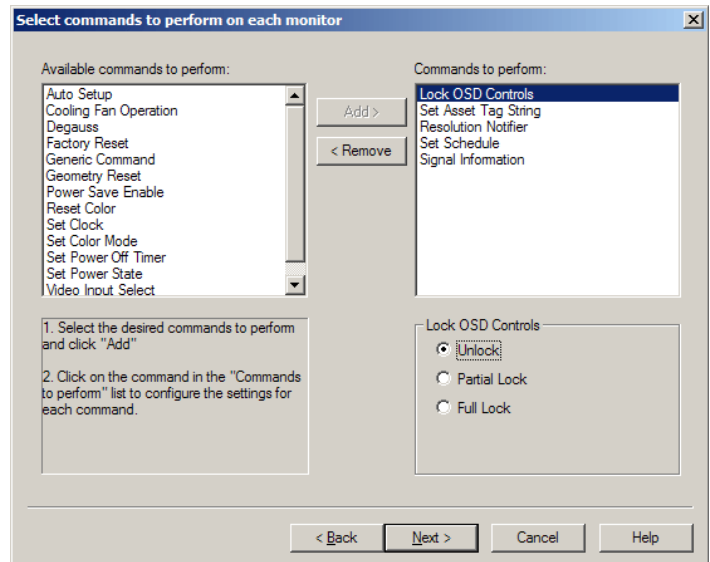
- NEC DDC/CI-compatible display monitor and compatible video graphics adapter and video driver (see separate compatibility chart) for full bi-directional communications support with the display monitor (required for monitor control adjustment and reading some metadata items)

WMI Provider (RS232 version) features require additionally require:

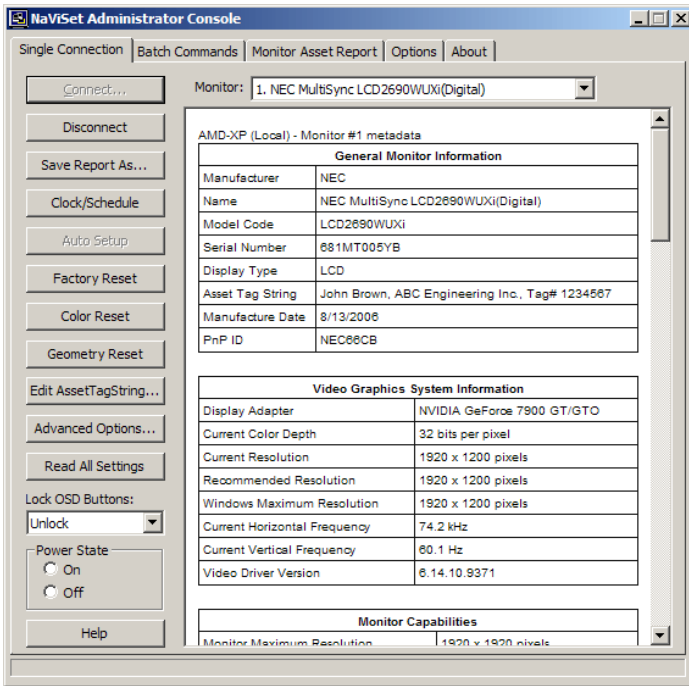
- NEC large-screen display that supports RS-232
- Available COM port and RS-232 cables

NEC's open and flexible licensing agreement allows the WMI Provider to be installed on all machines in an organization, regardless of if they all have an NEC display connected. This not only simplifies deployment but also provides the additional benefit of being able to obtain accurate information about each display monitor.

NaViSet Administrator is available free of charge for qualified customers from your NEC Display Solutions representative.



Commands and settings to be made on multiple remote machines can be configured and then performed as a batch.



NaViSet Administrator Console Application: Shows the current status and settings of the display monitors on a remote machine. Individual controls and settings can be adjusted.

This white paper was published in and based on information as of February 2007. Technical information is subject to change.